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| 10/502,432 | 07/25/2005 | Alexander M. Korsunsky | ISI-003US | 8126 |

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LAHIVE & COCKFIELD, LLP
FLOOR 30, SUITE 3000
ONE POST OFFICE SQUARE
BOSTON, MA 02109

| EXAMINER | |
|---|---|
| MIDKIFF, ANASTASIA | |
| ART UNIT | PAPER NUMBER |
| 2882 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/502,432 | KORSUNSKY, ALEXANDER M. | |
| | Examiner | Art Unit | |
| | ANASTASIA MIDKIFF | 2882 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *07 August 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *21-23* is/are allowed.

6)☒ Claim(s) *1-20 and 24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 4-6, 8-15, 17-20, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent to Siewert et al. (US 5,589,690).

With respect to Claims 1, 2, 5-6, 8-9, and 18-20, Siewert et al. teach an x-ray diffraction apparatus for the analysis of polycrystalline materials, and the method for its use, comprising:

- providing a polycrystalline material sample (30, 34, 38) for analysis (Column 2 Lines 18-36, Column 4 Lines 42-43, and Column 11 Lines 14-15);
- providing a polychromatic x-ray source (10), wherein the source produces x-rays by accelerating charged particles to energies of no more than 500 MeV (Column 4 Lines 55-61 and Column 12 Lines 37-38);
- collimating x-rays from the polychromatic x-ray source into a beam having a small divergence (14; see Column 4, Lines 43-46, Column 6 Lines 66-67, and Column 7 Lines 1-12), and a penetration depth of ≥ 1 mm (Column 6 Lines 31-35, Figure 3, Column 10 Lines 50-67, and Column 11 Lines 1-19);

- exposing sample to the collimated x-ray beam by scanning the sample with the x-ray beam (Column 11, Lines 42-47), wherein the x-ray beam is diffracted (Column 4, Lines 55-64);
- collecting at least some of the diffracted x-rays in an energy dispersive x-ray detector (22; see Column 8, Lines 8-23); and,
- analyzing the collected, diffracted x-rays to map the lattice parameter in the polycrystalline material (Column 10, Lines 10-46).

Siewert et al. discloses the claimed invention except for a beam divergence in the range of from $10^{-4}$ to $10^{-2}$ radians.

However, Siewert discloses that the beam has a narrow range of angular orientations and small spatial size (Column 4, Lines 43-46, and Column 6 Lines 66-67), is substantially parallel (Column 7, Lines 11-12), and that beam divergence is chosen based on a trade-off between image resolution and beam intensity for the application desired (Column 7, Lines 3-6).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose a range of from$10^{-4}$ to $10^{-2}$ radians in accordance with the application desired, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller, 105 USPQ 233 (CCPA 1955).*

With respect to Claims 4 and 24, Siewert et al. further teach that the energy of the collimated x-ray beam is in the range of 100-300 keV (Column 12 Lines 37-35).

With respect to Claims 10-12, Siewert et al. further teach that lattice parameter determination is used to provide information on phase distribution and sub-surface stresses or strains in the polycrystalline material at a depth of ≥ 1 mm (Column 10, Lines 10-46).

With respect to Claim 13, Siewert et al. further teach that the polycrystalline material is an engineering material or a natural material, or component part thereof (Column 2, Lines 19-36).

With respect to Claims 14, 15, and 17, Siewert et al. further teach that said polycrystalline material comprises a metal and a crystalline polymer in a composite with a crystalline phase, and has a thickness of ≥ 1 mm (Column 2, Lines 19-36, Column 10 Lines 50-52 and 66-67, Column 11 Lines 1-3, 14-17, and 32-34).

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Siewert et al. in view of Canberra Capabilities Profile Brochure (April 2002).

With respect to Claim 3, Siewert et al. teach most of the elements of the claimed invention, including an energy dispersive germanium x-ray detector (Column 8, Lines 8-23), but does not specifically teach that said detector has a relative energy resolution of from $0.5 \times 10^{-2}$ to $5 \times 10^{-2}$.

Canberra teaches a germanium x-ray energy dispersive detector for x-ray diffraction analysis (Page 21), wherein Applicant admits such detectors having a resolution of from $0.5 \times 10^{-2}$ to $5 \times 10^{-2}$ were known at the time of invention to be

suitable sources for the methods of the present invention (see Specification, Page 5, Lines 1-10).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a high-resolution germanium energy dispersive x-ray detector in the method of Hall, to provide a suitable high quality detector for x-ray diffraction analysis of polycrystalline material, as suggested by Canberra, and as admitted by Applicant (see Specification, Page 5, Lines 1-10).

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Siewert et al., as applied to Claim 6 above, and in view of U.S. Patent to Mitchell (US 4,561,062).

With respect to Claim 7, Siewert et al. teaches most of the elements of the claimed invention, including scanning the material with the x-ray source (Column 11, Lines 42-47), but do not teach that the polycrystalline material is held stationary during scanning.

Mitchell et al. teach an x-ray diffraction stress analysis method wherein a polycrystalline material is stationary while being scanned by an x-ray source (Column 7, Lines 48-66), so that large samples may be scanned in the field (Abstract Lines 1-11, and Column 8 Lines 24-27).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ a stationary sample scanning method in the method of Siewert et al. to provide a portable scanner for large specimens, as suggested by Mitchell et al. (Abstract Lines 1-11, and Column 8 Lines 24-27).

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Siewert et al., as applied to Claim 15 above, and in view of U.S. Patent to Mitchell (US 4,561,062),and further in view of International Application Publication to Arnott, et al. (WO 91/08372, PCT/GB90/01854).

With respect to Claim 16, Siewert et al. teach most of the elements of the claimed invention, including analysis of polycrystalline material that comprises an engineering article or component thereof.

Siewert et al. does not specifically teach that polycrystalline material is a glass or ceramic reinforced metal matrix.

Mitchell et al. teach an x-ray diffraction stress analysis method wherein a polycrystalline material is stationary while being scanned by an x-ray source (Column 7, Lines 48-66), so that large pipelines may be scanned in the field (Abstract Lines 1-11, and Column 8 Lines 24-27).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ a stationary sample scanning method in the method of Siewert et al. to provide a portable scanner for large pipelines, as suggested by Mitchell et al. (Abstract Lines 1-11, and Column 8 Lines 24-27).

Mitchell et al. is silent with respect to the material of the pipeline inspected.

Arnott et al. teach that pipelines for carrying oil are protected from fire and corrosion by covering a metal matrix base material with a glass or ceramic coating (Abstract and Page 3, Lines 5-18).

It would have been obvious to one of ordinary skill in the art to inspect a fire-protected metal and glass oil pipeline of Arnott (Abstract and Page 3, Lines 5-18) in the method of Siewert et al. and Mitchell et al., to analyze said pipeline for stresses in the field that may cause dangerous and costly oil leaks, as suggested by Mitchell et al. (Abstract Lines 1-11, and Column 8 Lines 24-27).

***Allowable Subject Matter***

Claims 21-23 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

With respect to Claim 21, the prior art of record teaches many of the elements of the claimed invention, including a method of determining the sub-surface distribution of the crystal lattice parameter in a polycrystalline material, the method comprising: providing a sample for analysis, wherein the sample comprises a polycrystalline material; providing a polychromatic x-ray source, wherein the source produces x-rays by accelerating charged particles to energies of no more than 1 MeV; collimating x-rays from the polychromatic x-ray source into a beam having a divergence in the range of from $10^{-4}$ to $10^{-2}$ radians and a penetration depth of $\geq 1$ mm; scanning the collimated x-ray beam across the sample, whereby the beam is diffracted; collecting at least some of the diffracted x-rays in an energy dispersive x-ray detector or array; and analyzing the collected, diffracted x-rays to determine a lattice parameter in the polycrystalline material.

However, prior art fails to teach or fairly suggest the method wherein analyzing the collected, diffracted x-rays includes quantitatively mapping the lattice parameter, in the manner required by Claim 21.

Claims 22 and 23 are allowed based on their dependency.

***Response to Arguments***

Applicant's arguments with respect to claims 1-10, 13-20, and 24 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments, see Applicant Remarks, filed 07 August 2009 with respect to prior art rejections of Claims 21-23 have been fully considered and are persuasive. The prior art rejections of Claims 21-23 have been withdrawn.

Applicant's arguments filed 07 August 2009, with respect to the prior art rejections of Claims 11 and 12 have been fully considered but they are not persuasive.

With respect to Claims 11 and 12, the Applicant asserts that Siewert does not teach that lattice parameter distribution is used to map phase distributions, stresses and/or strains in the polycrystalline material, because Siewert does not teach mapping of said lattice parameter. (See Applicant Remarks, Page 3, Lines 9-18). The examiner respectfully disagrees.

In response to applicant's argument that Siewert does not teach using said lattice parameters to map phase distributions, stresses and/or strains in the polycrystalline material, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to

patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Claims 11 and 12 are directed to a system, wherein the system of Siewert functions to determine lattice parameters, said lattice parameters capable of being used for mapping.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANASTASIA MIDKIFF whose telephone number is (571)272-5053. The examiner can normally be reached on M-F 7-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. M./
Examiner, Art Unit 2882
09/03/09

/Edward J Glick/
Supervisory Patent Examiner, Art Unit 2882